

## SICKLE-BEARING BUSH-CRICKET, *PHANEROPTERA FALCATA* (PODA) (ORTHOPTERA: TETTIGONIIDAE), BREEDING IN SOUTH-EAST ENGLAND

G. A. COLLINS<sup>1</sup>, P. J. HODGE<sup>2</sup>, M. EDWARDS<sup>3</sup> and A. PHILLIPS<sup>4</sup>

<sup>1</sup>15 Hurst Way, South Croydon, Surrey CR2 7AP

<sup>2</sup>28 Harvard Road, Ringmer, Lewes, East Sussex BN8 5HJ

<sup>3</sup>Lea-side, Carron Lane, Midhurst, West Sussex GU29 9LB

<sup>4</sup>Flat 5, 21 West Hill Road, St Leonards On Sea, East Sussex TN38 0NA

### ABSTRACT

The discovery of a breeding colony of *Phaneroptera falcata* in south-east England is described. Characters for separating it from other British bush-crickets and from the other member of the genus *Phaneroptera* which has been recorded from Britain are given. Previous British records of the species are briefly discussed.

### INTRODUCTION

*Phaneroptera falcata* (Poda) (Plate 1, Fig. 1) is a slender, long-winged, pale green bush-cricket. It occurs in much of Europe, but is absent from Scandinavia and some of the Mediterranean countries. It is also absent from the Channel Islands. Three other species of *Phaneroptera* occur in Europe. *P. gracilis* Burmeister is restricted to Romania (also occurring in parts of Asia), and *P. sparsa* Stål to Spain (also in Africa), whereas *P. nana* Fieber is widespread but with a more southern distribution than *P. falcata*.

### THE DISCOVERY

During 2006 the four authors were conducting an invertebrate survey of the cliffs and land immediately behind them at Hastings Country Park Nature Reserve, East Sussex. On 11th August we visited one of our survey compartments which consisted of a scrubby field containing predominantly bracken. A few days prior to our visit a fire had started in an adjacent field and the local fire brigade had used the survey field for access and to park their vehicles. The resulting activity had flattened much of the bracken, leaving an 'island' of rosebay willowherb in the centre, and we were drawn to this. Almost immediately two of us had caught bush-crickets which were clearly out of the ordinary. Although superficially resembling Long-winged Cone-head, *Conocephalus discolor* (Thunberg), which was common all over the area, they were obviously larger and lacked the dark dorsal stripe of that species. We now all started looking more closely and found more and more. In addition to the fully-winged adults a number of smaller, short-winged individuals were found. They looked more like Speckled Bush-cricket, *Leptophyes punctatissima* (Bosc), than *Conocephalus* but the wings were almost half as long as the abdomen and in the reversed position indicating that these were nymphs (Plate 1, Fig. 2). These too proved to be *Phaneroptera*.

An estimate of numbers present suggested a colony of perhaps 20 individuals including a number of nymphs.

The site at Hastings was visited again by one or more of the authors and other individuals on a number of occasions up to 10th September. Some *Phaneroptera* were

found on each occasion including one male and one female on the last date. Other areas of the Country Park were investigated but the insect could not be found there.

#### IDENTIFICATION

*Phaneroptera* belongs to the subfamily Phaneropterinae of the Tettigoniidae, and so amongst British species it is most closely related to *Leptophyes*.

They are medium-sized, long-winged bush-crickets. The initial impression is of quite a large insect but this is an illusion since the body is actually rather small. The wings are very long, the forewings exceeding the body length and the hindwings projecting beyond them by about a third of their length. In addition, the legs are rather long and spindly. The female ovipositor is very short, broad and abruptly up-curved. The male cerci are long and strongly curved. The colour is a pale yellowish-green overlaid with numerous small pale brown spots. Dorsally, where the forewings meet, there may be a yellowish-brown stripe, but this is much less obvious than in the cone-heads and does not extend forwards onto the pronotum. The overall length, from head to wing-tips, is about 30–35 mm.

Bush-crickets, unlike grasshoppers, have tympanal or auditory organs situated on their fore tibiae. In *Phaneroptera* this organ is oval, in other British bush-crickets, with the exception of *Leptophyes* and *Meconema* it is slit-like (Figs. 3a–b). The combination of the shape of this organ and long wings in which the hindwings project well beyond the forewings should enable a generic diagnosis.

The two species of *Phaneroptera* that are widespread in Europe are very similar but can be separated by the structure of the male subgenital plate; in *P. nana* this tapers towards the apex, but in *P. falcata* it is widened apically with two divergent lobes (Figs. 3c–d). There are differences in the female ovipositor, but these are slight and require comparative material. In *P. falcata* the pronotum in side view is at least as long as high, whereas in *nana* the pronotum is shorter than high (Figs. 3e–f).

#### HISTORY

This is not the first time that *P. falcata* has been recorded from Britain. At the end of the nineteenth century two individuals were reported from Cornwall as follows: Porthgarra, near Land's End, September 1881 "at rest on the grass near a footpath" by Dr Mason, and Sennen Cove, 11 September 1884 by W. Daws (Lucas, 1920). The latter record was only revealed in 1907 when the captor sent the specimen, or at least the remains of it, to Lucas. Both these localities are in West Cornwall, only a few miles apart.

There is also a record from Dorset. In August 1931, W. R. Frazer took a male bush-cricket at Seatown in Dorset (near Bridport) but did not keep the specimen. He later "had good reason" to believe that it was *Phaneroptera falcata* (Kevan, 1953).

On 12 September 2006, about a month after our Hastings captures, a male specimen was taken at New Milton in South Hampshire flying across a garden after dark; its identity confirmed by Bryan Pinchen (Sutton, 2006).

*Phaneroptera nana* has also occurred in Britain, but only in circumstances which suggest accidental importation. In August 2006, Max Barclay found a number of *Phaneroptera* nymphs at Fulham, Middlesex, which were reared to adulthood to confirm their identity as *P. nana*. These were suspected to have been imported with alien plants from Italy (Sutton, 2006). In 1905 it was found in some numbers in a vinery near Chester (recorded as *P. quadripunctata* – a synonym of *nana*) (Lucas, 1920).

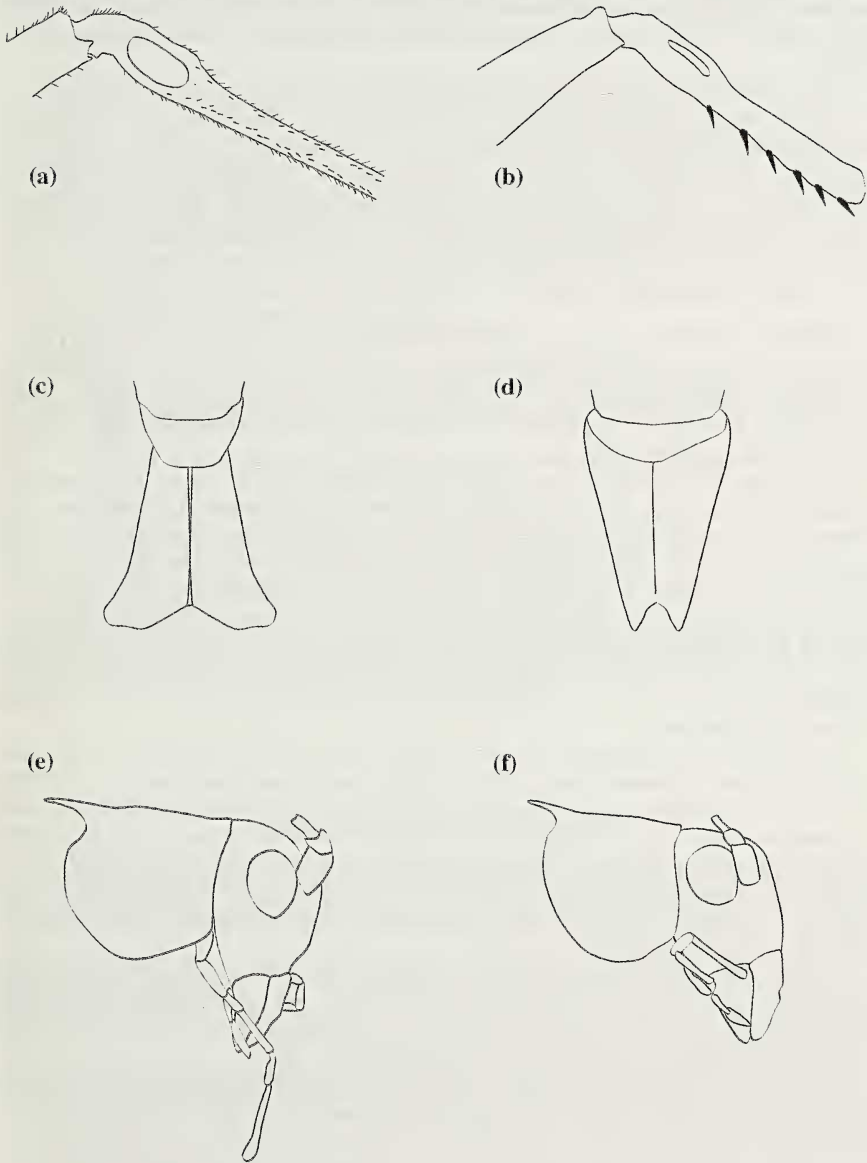


Fig. 3. External morphology of *Phaneroptera falcata* in comparison with related bush-crickets. Base of fore tibia showing tympanal organ of (a) *P. falcata*, (b) *Conocephalus* sp.; male subgenital plate (ventral view), (c) *P. falcata*, (d) *P. nana*; head and pronotum (lateral view), (e) *P. falcata*, (f) *P. nana*.

### LIFE HISTORY

The adults are fairly obvious and fly readily, but the song is short, quiet and produced mainly at dusk (Bellmann, 1988), so the use of a bat detector might help to locate males. It is also active at night, and Burr (1936) states "I have known it fly to light".

It is a warmth-loving species of scrub and grassy habitats and is phytophagous.

The female lays her eggs singly between the upper and lower surfaces of a leaf, sloe being one species mentioned by Bellmann (*loc. cit.*). In order to assist with this tricky operation, the ovipositor is guided by being held in the mandibles. The eggs hatch the following year, unlike many British bush-crickets in which they remain as diapausing eggs for two or more years. The nymphs feed up during the summer, maturing in August and living on into the autumn.

### DISCUSSION

Although there are very old Cornish records, this occurrence in south-east England is the first modern record in Britain. Since nymphs, which cannot fly, as well as numbers of adults were present, it is evident that colonisation occurred at least a year prior to our discovery.

It is always difficult to be absolutely certain of the origin and mode of establishment of such species in Britain. However, in Europe *P. falcata* has been expanding its range towards the north-west for a while now. Apart from a single occurrence in 1968 it has established itself in the Netherlands since 1984 with many new records in recent years (Kleukers *et al.*, 1997; Kleukers, 2002). In France it is currently widespread in central and northern areas (Voisin, 2003), although at the time of the Cornish records it was absent from the north and from Belgium (Burr, 1897). This recent spread to areas of the Continent adjacent to the south-coast of England, combined with its well developed ability to fly, makes a good case for natural colonisation.

The Cornish (Porthgwarra) record was, at the time, attributed to an insect alighting from a passing vessel (Burr, 1897). Since it did not occur on the near Continent at the time, some form of assisted arrival would indeed be the most likely explanation, although the proximity of the two records in place and time could indicate temporary residency. The Porthgwarra site was investigated by R. M. Payne in 1967, but *Phaneroptera* was not relocated (Payne, 1969). The Dorset record, which it must be admitted is at best 'unconfirmed', has been discounted by a number of authors (e.g. Ragge, 1965).

Its apparent association with rosebay willowherb may have been a consequence of the destruction of much of the rest of the vegetation in the field, the rosebay willowherb being the only structured vegetation that remained. Elsewhere in Europe it has been associated with species of *Rubus* and with sloe.

It would seem highly likely that *P. falcata* might become established in southern England, and suitable areas, especially along the coast, should be searched in late summer.

### ACKNOWLEDGEMENTS

The authors thank Chris Haes and Peter Sutton for information on the earlier British records and Roger Hawkins for confirming the identity of the species and with assistance in translating the continental literature.



This survey was commissioned by Hastings Borough Council as part of the Hastings Country Park Nature Reserve Restoration Project to restore cliff-top heathland and grassland, improve biological information and improve public access to this nationally important soft rock cliff coastline.

#### REFERENCES

- Bellmann, H. 1988. *A field guide to the Grasshoppers and Crickets of Britain and northern Europe*. Collins, London.
- Burr, M. 1897. *British Orthoptera (Earwigs, Grasshoppers and Crickets)*. The Economic and Educational Museum, Huddersfield.
- Burr, M. 1936. *British Grasshoppers and their Allies*. Philip Allan & Co., London.
- Harz, K. 1969. *Die Orthopteren Europas. Volumen 1*. Junk, The Hague.
- Kevan, D.K.McE. 1953. Notes on the distribution of British Orthopteroids. *Journal of the Society for British Entomology* 4: 119–122.
- Kleukers, R. 2002. Nieuwe Waarnemingen aan Sprinkhanen en Krekels in Nederland (Orthoptera). *Nederlandse Faunistische Mededelingen* 17: 87–102.
- Kleukers, R., van Nieukerken, E., Odé, B., Willemse, L. & van Wingerden, W. 1997. *De Sprinkhanen en Krekels van Nederland*. Nederlandse Fauna I. Nationaal Natuurhistorische Museum Nederland.
- Lucas, W.J. 1920. *A monograph of the British Orthoptera*. Ray Society, London.
- Marshall, J.A. & Haes, E.C.M. 1988. *Grasshoppers and allied insects of Great Britain Ireland*. Harley Books, Colchester.
- Payne, R.M. 1969. A disappointing day at Porthgwarra. *Entomologist's Record and Journal of Variation* 81: 91–92.
- Ragge, D.R. 1965. *Grasshoppers, Crickets and Cockroaches of the British Isles*. Frederick Warne, London.
- Sutton, P. 2006. Wildlife reports – grasshoppers and relatives. *British Wildlife* 18: 53–54.
- Voisin, J.-F. 2003. Atlas des Orthoptères (Insecta: Orthoptera) et des Mantides (Insecta: Mantodea) de France. *Patrimoines Naturels* 60: 1–104.

#### SHORT COMMUNICATION

**A record of *Tetrastichus legionarius* Giraud (Hymenoptera: Eulophidae) from Kent.**— On 22.iii.2006 I collected some galls of *Lipara lucens* Meigen (Diptera: Chloropidae) in stems of *Phragmites australis* (Cav.) Trin. ex Steudel from the extensive reed beds at Stodmarsh, Kent, (TR2261). The galls were kept in a well-ventilated and shaded garden shed and from one of the galls two male and 11 female *Tetrastichus legionarius* Giraud emerged on 3.vii.2006. This species is well known as a gregarious parasitoid of *L. lucens* in Europe but there is only one previous report of *T. legionarius* in Britain. Six males and 26 females were reared from a gall collected on 12.vi.1996 at Rushey Mead Nature Reserve, Essex (Plant, 1997, *Entomologist's Record & Journal of Variation*, 109: 10). Elsewhere in its range *T. legionarius* is said to be uncommon or rare. A study in the Netherlands showed that from over 10,000 opened galls only two *L. lucens* puparia were found to be parasitised by *T. legionarius* (Chvalá, Doskočil, Mook & Pokorný, 1974, *Tijdschrift Voor Entomologie*, 117: 23).

The specimens of *T. legionarius* have been deposited in the collections of R.R. Askew, whom I thank for their identification. I also thank Natural England for permission to collect at Stodmarsh National Nature Reserve. – M.T. JENNINGS, 206 Lower Higham Road, Gravesend, Kent, DA12 2NN